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SERIES I. EVALUATION OF FOREIGN FRUITS AND NUTS

NO. 12. APPLES

EVALUATION OF LATE BLOSSOMING APPLE INTRODUCTIONS

by

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Evaluation of Late Blossoming Apple Introductions

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INTRODUCTION

Damage to fruit blossoms from late spring frosts constitutes one of the greatest single hazards for fruit growing in this country, particularly in some of the midwestern areas. In most fruit growing sections, spring frosts are likely to reduce the apple crops greatly in certain years, while in some localities this may run as high as one out of every three years. Studies of the varietal differences in the resistance of apple flowers to frost (15,30,38) point out that differences do exist while other investigations (65,82) indicate that degrees of resistance or susceptibility are more apparent than real. Reliable analysis of surveys of varietal susceptibility to frost injury are extremely difficult because the damaging frost usually occurs on one night only, when the many varieties studied are at different stages of bud development; thus some varieties are at a less vulnerable stage of development than others. Artificial freezing techniques have in part resolved this problem, but lead to other variable factors such as the effect of differences in the pre-condition environment on such test results. Regardless of inherent frost resistance of the flowers, varieties which blossom a week to 10 days later than standard types have an increasingly better chance to escape such losses. Thus, the greater emphasis in breeding has been toward the development of late blossoming types rather than toward varieties possessing possible frost hardy flowers.

One of the chief difficulties that has impeded progress in the use or breeding of late blossoming varieties has been that few varieties combine the late blossoming trait with fruit of good market quality. The late blossoming character is present in 'Rome Beauty', 'Gallia Beauty', 'Golden Delicious', 'Mother', 'Ralls', and certain other varieties and these have been used extensively in breeding programs in the United States (30,37,56). Some success has also been accomplished along this line by researchers abroad using other late blossoming sorts (38,72,82). The objective of this paper is to present sources of late blossoming apples which may not be known to many breeders in this country and which may be of value in breeding projects directed toward later blossoming types.

1/ Horticulturist in charge

The collection of foreign and domestic apples growing at the U. S. Plant Introduction Station, Glenn Dale, Maryland, includes slightly more than 800 named varieties and unnamed sorts of fruiting age. New apple introductions are budded on apple seedling stocks purchased from commercial nursery establishments. Orchard tree plantings are maintained in permanent orchard grass; all mowings are allowed to return to the soil. The soil is a Collington fine - sandy loam. Fertilizers are applied only as needed to maintain new growth. Pruning is limited to that necessary to maintain tree vigor and to allow adequate spray coverage. A systematic spray program is in effect in all orchards and nursery areas.

Part of the program of evaluating plant introduction materials is the annual recording of various phenological characteristics, including fruit descriptions. This paper presents information on 58 late blossoming apples tested at Glenn Dale for varying lengths of time up to 20 years. During this time fruit descriptive records were made by F. C. Bradford, W. E. Whitehouse, H. F. Winters and the author. With few exceptions, fruit characteristics of all the varieties presented have been described by the author. In many cases at least three of the above investigations have either separately or cooperatively described the same variety.

PROCEDURE

The methods of procedure used in this paper are very similar to those of a previous paper (1). As in that paper, the fruit descriptions have been abbreviated from the original field records for the sake of brevity. The varieties 'Yellow Delicious', 'Macross', 'Winter Wealthy', 'Lobo', 'Macoun', 'Rome Beauty Glengyle Red Strain', and 'Red Australian Rome Beauty', are included in the tables for comparative purposes, but are not included with the fruit descriptions. Fruit descriptions are arranged alphabetically according to variety name and the varieties are listed in the tables in sequence of average date of full bloom. Data are presented under a number of separate headings. Explanations of how these data were developed are as follows:

Variety Names are used as they appear in the Plant Explorations and Introduction Inventory except as corrected. Where possible, fruit descriptions have been compared with those in various reference works, but no guarantee is made for the authenticity of the introduced varieties.

Synonyms used have been taken from the reference works cited, from correspondence, and from data obtained from the source or originator. Where there is a reasonable doubt as to the accuracy of the synonym, it is included, but followed by a question mark. Where a synonym appears incorrect, this is so indicated.

Origin of a variety or seedling has been ascertained as far as possible from the literature cited, personal correspondence, station records, catalogs and other printed matter.

Source indicates where or from whom the particular variety or seedling introduction described in this paper was secured by the USDA Crops Research Division.

Literature cited presents descriptive and/or other data about the variety in question. No attempt was made toward an exhaustive review of the literature. Considerable data regarding early citations were obtained from notes made by F. C. Bradford, former horticulturist in charge of this station.

Full Bloom was considered as that time when approximately 75 percent of the blossoms on a tree had opened. Date of full bloom as presented with each fruit description represents the average of this occurrence for the years 1959, 1961, 1962, and 1963. The precise dates for each year of observation are listed in Table II.

First Leaf emergence was determined as that time at which a reasonable proportion of the leaf blades at the terminals over the tree as a whole had grown approximately one half to three quarters of an inch in length.

Fruit Characteristics have been based on a minimum of six fruits selected as typical of the crop. The descriptions presented represent a summation and averaging of the evaluation work of all four investigators previously mentioned. The various characteristics described are as follows: Size measurements were taken with a Vernier caliper of the average diameter and length of at least six fruits considered as typical. Because a shortage of labor prevented a systematic thinning of orchard fruits, size measurements are generally somewhat smaller than what may be expected under commercial conditions. Shape descriptions as used here are principally the same as those of Hedrick (24). Shape may be assumed as relatively uniform unless otherwise indicated. Color data consists of the percentage of fruit surfact showing over-color, its pattern or type, and the ground-color. Flesh characteristics and quality are more prone to variations due to the subjectivity of the evaluator than any of the other characteristics mentioned. An effort was made to compare the overall pattern of each of the four evaluators with that of the others and to standardize the summations for each character described. Even so, it should be recognized that flesh and quality ratings represent the judgement of several individuals and no "taste panel" tests were performed.

Harvest Date as presented represents the average date for this occurrence during the years the fruits were observed at Glenn Dale from 1959 through 1962. Dates were based on the ease of fruit removal from the branch, the color and maturity of the seeds and color of the skin. The average dates of full bloom and of harvest together with the average length of the maturation season are presented in Table III.

General notes are included to point out particular traits or observations considered pertinent, but not covered under fruit description headings. These comments may include observations made at Glenn Dale or bits of information taken from the literature as indicated.

Fire blight index information is included because this disease, caused by blight organism Erwinia amylovora (Burr.) Winslow, et al., has resulted in considerable loss of crops of some introductions during certain years, while other introductions appear resistant or escape infection. A control program for fire blight, incorporating the use of Agrimycin, is being followed for nursery areas and mature pears. In the apple orchards the disease has been allowed to spread naturally, the only control consisting of the removal of cankers and severely damaged limbs toward the end of each season. During the last four years outbreaks appeared in all orchard blocks and an index of infection was made during 1959, 1960 and 1961. Fire blight infection was based on a numerical scale ranging from 0 to 5 in ascending order of symptom expression. The approximate percentage of spurs and branches showing symptoms were arbitrarily assigned as follows:

- 0 - no visible signs of Fire Blight
- 1 - less than 5 percent of tree showing disease symptoms
- 2 - 5 to 15 percent of tree showing disease symptoms
- 3 - 16 to 25 percent of tree showing disease symptoms
- 4 - 26 to 49 percent of tree showing disease symptoms
- 5 - 50 percent or more of tree showing disease symptoms

The indicies presented with the fruit descriptions represent the averages of the three years of observations. Although the original observations were expressed in whole number categories, the averages in most cases result in fractions between them.

Since inoculations with the pathogen were not made, it is quite probable that some trees which showed no symptoms during the three years may be escapes. Therefore, the data presented is only an indication of possible resistance and by no means actual proof thereof.

DISCUSSION AND RESULTS

Any detailed study of late blossoming of apple, based on listings of varieties according to their sequence of blooming, is hazardous. Differences of relative time of blossoming of the same varieties in different locations or of the same trees in different years can be rather widespread and at times quite undependable. A number of factors can be offered as explanation, including, different root stocks on which the varieties are grown, difference in variety reaction to summation of heating and chilling unit hours experienced prior to blossoming, differences in blooming habits of varieties i.e., predominance of spur versus lateral blooming, variations in soil moisture content and soil temperature, effect of ground cover, etc. Although the writer has attempted to minimize the effects of these variables where possible, no guarantee can be made that the varieties listed will behave for others as they have at Glenn Dale during the years of observation.

The apple introductions described include dessert, culinary, and non-astringent cider types. It was observed that a high percentage of the cider varieties in the Glenn Dale collection are distinctly late blossoming, suggesting a correlation between late blossoming and those fruit characters associated with cider varieties. Cider types possessing bitterness, high tannin content, or astringency were excluded, while those possessing none of these objections are presented as of possible interest to breeders.

Fruit characteristics such as size, appearance, and quality in most cases are distinctly sub-standard when compared with commercial varieties. Size range extends from slightly less than 2 inches to more than 3 1/2 inches in diameter. Percentages of the several size categories are: 2% less than 2 inches; 42%, 2 to 2 3/8 inches; 38%, 2 1/2 to 2 7/8 inches; 12%, 3 to 3 3/8 inches; and 6%, 3 1/2 inches or greater. On the basis of quality alone none of the varieties was considered as better than good. Ten varieties which are considered of good quality are 'Bouteille de Liseux', 'Cherry Pearmain', 'De Flandres', 'Dymock Red', 'Emilia', 'Gewurzluiken', 'Lande', 'Merton Delight', 'Saltcote Pippin', and 'Tom Putt'. Three of these are later blossoming than 'Rome Beauty' and are therefore the most outstanding. These are 'Lande', P.I. 162724, which resembles 'York Imperial' in shape, could use more color, is somewhat mild in flavor, but of good quality; 'De Flandres', P.I. 127358, a firm summer apple of good color, but somewhat irregular in shape; 'Bouteille de Liseux', P.I. 161758, a rather late, juicy, sweet, green apple, which although unattractive from a dessert apple standpoint, does attain good quality at Glenn Dale.

In Table I the average temperature and total precipitation are given for the months of September through May during the seasons 1958-59, 1960-61, 1961-62, and 1962-63. No delayed dormancy attributable to insufficient winter chilling was observed on any of the varieties studied during the four years of observation. In the 1958-59 season, temperatures during September, October and November did not deviate greatly from normal, but were 6.2 and 3.2 degrees below normal during December and January respectively. Approximately normal temperatures were again experienced through February and until March 19. Maximum daily temperatures from the middle 60's to high 70's were common during the last two weeks in March. Both April and May were warmer than normal, maximum temperatures frequently being in the high 70's and middle 80's. Blossoming started several days earlier than usual and advanced rapidly during the warm days of April and early May. Mid-season and late blossoming varieties were somewhat in advance of their normal season.

In the 1960-61 season temperatures during September, October and November were approximately normal, but were 7.7 and 9.4 degrees below normal during December and January, respectively. This was followed by slightly above normal temperatures during February and March, while temperatures 3.9 and 4.0 degrees below normal were experienced during April and May. With the exception of six scattered days during the second half of April, the maximum daily temperatures did not exceed the middle 60's until the second week in May. The blossoming season was slow in getting started, mid-season varieties blossomed several days later than usual, while late varieties were very much retarded, some of them not coming into bloom until the closing days of May.

In the 1961-62 season temperatures were warmer than normal during September and November, normal during October and slightly below normal during December, January, February and March. This was followed by normal temperatures in April and above normal in May. Maximum daily temperatures were well up in the middle 80's during the last ten days of April and first part of May. Blossoming started in season and advanced normally until mid-season, after which it advanced very rapidly with late varieties blossoming earlier than usual. As a result, there was less difference between mid-season and normally late-blossoming types than during most years. The time between full bloom of 'Yellow Delicious' and the latest variety to bloom in Table II, was 20 days in 1962, compared with 27 days in 1959, 29 days in 1963, and 34 days in 1961.

The winter season of 1962-63 was unusually cold. With the exception of October, which was 1.7 degrees above normal, temperatures ranged from 2.7 to 6.4 degrees below normal for the months of September through February. This was followed by 4.4 and 0.9 degrees above

normal during March and April. Maximum temperatures in the 60's occurred sporadically during the first half of March, while temperatures in the middle 70's and low 80's were quite common during the last half of the month. Although the average temperature for April was but little above normal, the month was a sunny one, with very little rain or cloudy weather. Thus, although night temperatures were cool, day temperatures reached the 60's on 15 days, the 70's on 6 days, and the 80's on 6 days during April. The first 10 days of May continued sunny and warm with maximum temperatures mostly from the middle 70's to middle 90's. This was followed by several days in the middle 60's. Early varieties blossomed at about the usual time, but the season advanced extremely rapidly with mid-season and late varieties blossoming considerably in advance of their normal season. The average date of full bloom of late varieties in 1963 was 5 days earlier than in 1959, 7 days earlier than in 1962 and 12 days earlier than in 1961.

The date of first leaf has been used at this station as a rough indication for predicting the blossoming season on young non-bearing trees. As shown, the time of full bloom may occur somewhat before, with, or after first leaf. On the average, time of first leaf preceded full bloom by two days in 1963, by one day during 1959 and 1961, but averaged one day later in 1962. Individual varieties are not necessarily consistent from season to season in respect to the sequence of these two phenomena. A review of the other apple introductions under study at Glenn Dale discloses the same rather erratic behavior. Differences in the respective chilling and heating requirements of varieties for the initiation of flowering and vegetative development, as effected by seasonal weather conditions, would appear to be responsible for these inconsistencies. The influence of such factors has been rather extensively studied by a number of investigators, (2,9,14,62,91,92).

Prevailing temperatures during March and April of the several seasons were more effective in advancing or delaying blossoming and leafing than temperature differences during the previous fall and winter. In more southern locations or under milder winter conditions at Glenn Dale, than experienced during the years of this study, it would be expected that temperatures during the fall and winter months would have a more direct bearing on the time of blossoming and leafing.

The average date of full bloom and of harvest together with the average length of maturation season is shown in Table III. Little if any correlation exists between the time of full bloom and that of harvest. In a previous paper (1), a rough relationship did appear to exist between early ripening apples and early blossoming. Considering the minimum requirements for fruit maturation, this latter group was highly specialized and therefore not subject to generalization nor projection to include other varieties.

Indices representing the three-year averages of the degree of Fire Blight symptoms, as previously mentioned, are included with the fruit descriptions. Below, the varieties are divided into seven groups according to the degree of symptom expression. For comparative purposes, 630 early and mid-season blossoming introductions growing at Glenn Dale have been listed with those of the late blossoming varieties.

Percent of varieties showing degree of Fire
Blight symptom expression*

Time of blossoming	Number of varieties	0	0.1 to 0.4	0.5 to 0.9	1.0 to 1.9	2.0 to 2.9	3.0 to 3.9	4.0 to 5.0
		per- cent	per- cent	per- cent	per- cent	per- cent	per- cent	per- cent
early and mid-season	630	23	25	19	23	7	2	1
late	50	14	16	40	24	6	0	0

It had been considered likely that Fire Blight infection, spread from tree to tree mainly by bees and other insects visiting the flowers, would tend to increase in intensity as the season progressed. This would appear especially true in orchards such as those at Glenn Dale where the many varieties often provide an almost continuous blossoming period from early April to late May. However, as shown above, late blossoming varieties appear to be no more subject to the depredations of blight infection than are their earlier blossoming sisters.

Seven late blossoming varieties showed no signs of Fire Blight during the three years of observation. These of course could have been escapes. Perhaps of greater significance are the eight varieties which became infected with the pathogen but showed very low grade symptom expression, indicating a high degree of resistance.

*Indices are based on a numerical scale ranging from 0 to 5 in ascending order of symptom expression, previously described under Procedure.

Table I. Weather Data in Monthly Periods Between September 1 and May 31 During the Years 1959, 1960, 1961, 1962 and 1963

Month	Average Temperature (degrees Fahrenheit) and Departure from Normal								Total Precipitation (inches) and Departure from Normal							
	1958-59		1960-61		1961-62		1962-63		1958-59		1960-61		1961-62		1962-63	
	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Precip.	Dep.	Precip.	Dep.	Precip.	Dep.	Precip.	Dep.
Sept.	66.5	-1.3	68.1	0.3	72.0	4.2	65.1	-2.7	2.56	-1.47	5.94	1.91	1.03	-3.00	3.12	-0.74
Oct.	56.7	-0.1	55.6	-1.2	57.6	0.8	58.5	1.7	3.22	-0.18	2.37	-1.03	3.38	-0.02	2.25	-1.11
Nov.	47.4	1.6	46.5	0.7	49.4	3.6	42.6	-3.3	2.65	-0.66	1.61	-1.70	1.96	-1.35	6.29	3.07
Dec.	29.8	-6.2	28.3	-7.7	34.9	-1.1	31.3	-4.7	1.43	-1.47	2.48	-0.42	3.55	0.65	3.04	0.14
Jan.	32.4	-3.2	26.2	-9.4	33.7	-1.4	31.1	-4.0	2.30	-0.83	2.45	-0.68	1.67	-1.76	1.62	-1.81
Feb.	36.1	0.7	36.9	1.1	34.0	-1.9	29.5	-6.4	1.85	-0.89	4.52	1.78	3.76	0.93	1.97	-0.86
March	43.7	-0.1	45.7	1.9	41.7	-1.5	47.6	4.4	2.72	-1.14	3.10	-0.76	3.41	-0.43	5.86	2.02
April	56.8	3.5	49.3	-3.9	54.3	0.7	54.5	0.9	4.56	1.06	4.67	1.17	4.62	1.08	1.24	-2.30
May	67.4	3.6	59.8	-4.0	66.6	2.8	62.4	1.4	2.34	-2.13	3.65	-0.82	2.27	-1.96	1.49	-2.74

Table II. Dates of Full Bloom and First Leaf of Late Blossoming Apples for the Years 1959, 1961, 1962 and 1963 - with Averages for those Years.

Flowering and leafing dates expressed as days after March 31

Variety name	P.I. No.	1959		1961		1962		1963		Averages 1959-63	
		first leaf	full bloom	first leaf	full bloom	first leaf	full bloom	first leaf	full bloom	first leaf	full bloom
Yellow Delicious	*B-33869	23	21	27	27	25	24	19	16	23.5	22.0
Macross	143183	23	23	19	25	25	26	18	19	21.2	23.2
Winter Wealthy	*B-36583	24	26	28	29	27	30	18	20	24.2	26.2
Lobo	143180	26	27	27	32	28	30	20	20	25.2	27.2
Macoun	*B-33870	27	28	29	30	26	29	22	24	26.0	27.7
Drap D'or Guemene	131823	32	28	38	36	35	30	15	18	30.0	28.0
Tom Putt	125271	30	29	35	34	34	31	16	20	28.7	28.5
Rome Beauty Glengyle Red Strain	199694	29	29	30	31	27	30	22	24	27.0	28.5
Piekne Oltarzewa	132829		28	30	35	29	30	24	21	27.6	28.5
Beauty of Stoke	131434	30	28	34	35	29	31	19	20	28.0	28.5
Bodil Neergaard	104781	29	30	33	36	29	30	19	20	27.5	29.0
Cherry Pearmain	161831	28	30	34	36	29	30	16	20	26.7	29.0
Dymock Red	161836	28	29	29	35	30	29	21	23	27.0	29.0
Gewurzluiken	132225	29	28	34	33	29	33	19	22	27.7	29.0
Norfolk Royal	123729	31	29	36	36	32	31	19	20	29.5	29.0
Emilia	123989	29	30	35	35	34	32	17	21	28.7	29.5
Flaskeple	105182		29	29	35	30	30	20	24	26.3	29.5
Red Australian Rome Beauty	214080	29	30	31	34	29	32	21	23	27.5	29.7
Horner	161850	26	30	33	38	28	30	20	22	26.7	30.0
Ildrod Pigeon	114317	26	30	31	36	31	29	17	25	26.2	30.0
May Queen	123749	29	29	33	34	33	32	19	25	28.5	30.0
Merton Delight	205461	30	28	38	36	36	36	18	20	30.5	30.0

*Glenn Dale Station Numbers

Table II. - Continued

Variety name	P.I. No.	1959		1961		1962		1963		Averages 1959-63	
		first leaf	full bloom	first leaf	full bloom	first leaf	full bloom	first leaf	full bloom	first leaf	full bloom
Michelin	136487	31	29	39	36	36	33	25	22	32.7	30.0
Saltcote Pippin	123967		30	37	36	34	32	18	22	29.6	30.0
Winter Queening	131217	32	32	39	37	35	32	17	19	30.7	30.0
(no variety name)	209939	32	31	38	37	32	31	14	23	29.0	30.5
Lunowerapfel	132011	28	30	35	37	31	34	19	21	28.2	30.5
Clozette	162712		31	32	37	31	33	22	22	28.3	30.7
Bravo De Esmolte	183958	30	32	29	38	33	33	20	23	28.0	31.5
Pine Golden Pippin	157734	31	31	38	36	36	33	25	26	32.5	31.5
Winterrambour	126996	31	31	34	35	34	34	20	26	29.7	31.5
Reinette d'Espagne	126501	36	32	34	35	36		26	28	33.0	31.7
Oetwiler Reinette	134809	33	32	36	35	34		26	29	32.2	32.0
Crollon	162721	31	32	39	37	35	32	23	27	32.0	32.0
Frequin Lajoie	136255	30	32	35	39	33	33	22	26	30.0	32.5
Northern Spy X Malling No. 11	137439	35	33	44	38	35	33	29	26	35.7	32.5
Lemon Pippin	157731	33	33	38	38	36	35	22	25	32.2	32.7
Amaret	158727	31	34	41	39	33	32	19	27	31.0	33.0
Paraquet	123964	30	34	32	37	30	30	19	31	27.7	33.0
Present Van Holland	188520	33	33	41	36	32	30	23	33	32.2	33.0
Sandringham	157735	34	33	38	37	39	33	20	29	32.7	33.0
Faro	127360	31	33	39	37	34	32	33	32	34.2	33.5
Bouteille de Liseux	161758	31	35	43	41	37	32	28	30	34.7	34.5

Table II. - Continued

Variety name	P.I. No.	1959		1961		1962		1963		Averages 1959-63	
		first	full	first	full	first	full	first	full	first	full
		leaf	bloom	leaf	bloom	leaf	bloom	leaf	bloom	leaf	bloom
De Jaune	125560	31	35	42	37	40		34	34	36.7	35.3
Storappel	188524	35	35	40	41	33	34	32	32	35.0	35.5
Roter Bellefleur	132000	31	36	41	39	38	34	26	34	34.0	35.7
Court Pendu Plat	123960	32	39	42	41	35	36	24	28	33.2	36.0
De Flandres	127358	32	34	42	39	41	38	30	35	36.2	36.5
Beurriere	136246	32	39	40	42	33	34	30	34	33.7	37.2
Binet Violet	136247	32	36	43	40	42	41	38	32	38.7	37.2
Chataignier	136250	32	36	41	46	39	40	24	30	34.0	38.0
St. Laurent	158739	33	35	50	48	45	42	37	35	41.2	40.0
Cravert	131102	33	36	44	45	42	43	34	37	38.2	40.2
Binet Blanc	122598	38	43	50	53	41	42	30	33	39.7	42.7
Bedan	125745	42	44	59	56	48	43	36	33	46.2	44.0
Lande	162724	33	40	45	55	40	44	33	37	37.7	44.0
Fleuritard	136592	46	47	57	56	46	44	40	45	47.2	48.0
Lambron	136775	46	48	60	61	42	43	38	42	46.5	48.5

Table III. Average Date of Full Bloom and of Harvest Together with Average Length of Maturation Season

Variety name	Average date of full bloom	Average date of harvest	Average number of days between full bloom and harvest
Yellow Delicious	4/22	8/25	125
Macross	4/23	7/16	84
Winter Wealthy	4/26	8/14	110
Lobo	4/27	8/15	110
Macoun	4/28	8/30	124
Drap D'or Guemene	4/28	8/5	99
Tom Putt	4/29	8/15	108
Rome Beauty Glengyle Red Strain	4/29	9/6	130
Piekne Oltarzewa	4/29	8/13	106
Beauty of Stoke	4/29	9/15	139
Bodil Neergaard	4/29	9/3	127
Cherry Pearmain	4/29	8/15	108
Dymock Red	4/29	8/30	123
Gewurzluiken	4/29	9/10	134
Norfolk Royal	4/29	9/20	144
Emilia	4/30	9/12	135
Flaskeple	4/30	8/14	106
Red Australian Rome Beauty	4/30	-	-
Horner	4/30	9/19	142
Ildrod Pigeon	4/30	8/25	117
May Queen	4/30	8/19	111
Merton Delight	4/30	8/7	99
Michelin	4/30	9/7	130
Saltcote Pippin	4/30	8/30	122
Winter Queening	4/30	9/15	138
(no var. name) P.I.209939	5/1	9/18	140
Lunowerapfel	5/1	8/29	120
Clozette	5/1	9/10	132
Bravo De Esmolte	5/2	9/8	129
Pine Golden Pippin	5/2	8/26	116
Winterrambour	5/2	9/21	142
Reinette d'Espagne	5/2	9/6	127
Oetwiler Reinette	5/2	8/28	118
Crollon	5/2	9/6	127
Frequin Lajoie	5/3	9/2	122
Northern Spy X Malling No. 11	5/3	9/25	145
Lemon Pippin	5/3	9/28	148
Amaret	5/3	9/28	148
Paraquet	5/3	9/3	123
Present Van Holland	5/3	8/21	110

Table III. - Continued

Variety name	Average date of full bloom	Average date of harvest	Average number of days between full bloom and harvest
Sandringham	5/3	10/2	152
Faro	5/4	9/18	137
Bouteille de Liseux	5/5	10/2	150
De Jaune	5/5	9/11	129
Storappel	5/6	8/19	105
Roter Bellefleur	5/6	8/22	108
Court Pendu Plat	5/6	10/6	153
De Flandres	5/7	8/10	95
Beurriere	5/7	8/21	106
Binet Violet	5/7	9/9	125
Chataignier	5/8	9/15	130
St. Laurent	5/10	9/11	124
Cravert	5/10	9/12	125
Binet Blanc	5/13	9/15	125
Bedan	5/14	9/28	137
Lande	5/14	9/12	121
Fleuritard	5/18	9/12	117
Lambron	5/19	9/11	115

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APPENDIX

Description of Varieties

'Amaret'

P.I. 158727

Synonyms: 'Amer Doux', 'Amer-doux', 'Ameret', 'Bedan' (?), 'Dameret', 'D. Aout', 'Doux Amer' (incorrect), 'Gros Amer-doux' (?), 'Marin Oufroy', 'Petie-amer-doux' (incorrect), 'Roquet', 'Rouge rayee'. The name 'Amaret' and its synonyms designate a series of varieties grown in the cider production areas of France. P.I. 158727 'Amaret' is a different variety than P.I. 125745 'Bedan'.

Origin: not known.

Source: F. Dalaunay Nurseries, Angers, France, 4/22/47.

Literature: Baltet (5), Brioux (16), Fau (32), Power (66), Simon-Louis (73), Truelle (81) and Warcollier (85,87,90).

Date full bloom: May 3

Date first leaf: May 1

Fruit characteristics:

Size: diameter 3", length 2 1/2"

Shape: roundish ovate

Color: 60 to 80%, blushed, striped, crimson over yellow, some scarfskin

Flesh: white, crisp, breaking, firm, juicy, sweet

Quality: fair

Harvest date: September 28

Note: in France used chiefly for cider; at Glenn Dale, too sweet for good eating, no astringency, some water core.

Fire blight Index: 0.0

'Beauty of Stoke'

P.I. 131434

Synonyms: none known.

Origin: raised by Mr. Doe, gardener to Lord Saville, Rufford Abbey, England; introduced by Messrs. Veitch.

Source: George Bunyard & Company, Ltd., Maidstone, Kent, England, 1/27/39.

Literature: Taylor (79).

Date full bloom: April 29

Date first leaf: April 28

Fruit characteristics:

Size: diameter 2 7/8", length 2 3/8"

Shape: roundish oblate

Color: greenish yellow, no blush, slight russet

Flesh: greenish white, crisp, somewhat mealy, soft, rather dry, sub-acid

Quality: poor to fair

Harvest date: September 15

Fire blight Index: 1.0

'Bedan'

P.I. 125745

Synonyms: 'Ameret' (?), 'Bec d'Ane', 'Bec d'Angle', 'Bedane', 'Bedange', 'Bedangue', 'Berdan', 'Beurdan', 'Calotte', 'de Saint Hilaire', 'de Saint-Martin', 'Petit doux de Bretagne'. The name 'Bedan' and its synonyms designate a series of varieties grown in the cider production areas of France. P.I. 125745
'Bedan' is a different variety than P.I. 158727 'Amaret'.

Origin: a very old variety of unknown origin, but which has been traced by documentary evidence to 1363.

Source: Paul Lecolier, La Celle, Saint Cloud, Seine-et-Oise, France, 12/25/37.

Literature: Baltet (5), Barker (6), Brioux (16), Crochetelle (26), Duplessix (29), Fau (32), Kobel (45), Masseron (57), Power (66), Roberts et al., (70), Simon-Louis (73), Truelle (80,81), and Warcollier (85,87).

Date full bloom: May 14

Date first leaf: May 16

Fruit characteristics:

Size: diameter 2 1/4", length 1 7/8"

Shape: oblate, compressed, somewhat oblique

Color: 10 to 30%, speckled, washed, red over greenish-yellow

Flesh: creamy, crisp, breaking, firm, juicy, sweet

Quality: fair to good

Harvest date: September 28

Note: widely grown in France as a cider variety, some references describe 'Bedan' as sweet, others as bitter-sweet; at Glenn Dale, 'Bedan' shows no trace of bitterness.

Fire blight Index: 1.3

'Beurriere'

P.I. 136246

Synonyms: none known.

Origin: not known.

Source: Pepinieres A. Michel, Le Neubourg (Eure), France, 3/30/40.

Literature: Jonis, et al., (42) and Warcollier (85,87).

Date full bloom: May 7

Date first leaf: May 4

Fruit characteristics:

Size: diameter 2 1/2", length 2 1/4"

Shape: roundish conical

Color: 90 to 100%, striped and splashed, crimson over light green

Flesh: white, crisp, breaking, tender, juicy, sub-acid, peculiar flavor

Quality: poor to fair

Harvest date: August 21

Note: in France, a dual purpose fruit, dessert and cider.

Fire blight Index: 0.7

'Binet Blanc'

P.I. 122598

Synonyms: 'Binet', 'Binet blanc', 'Binet blanche', 'Binet-blanc ou dore', 'Binet dore'. Several distinct varieties grown in France under names 'Binet', 'Binet Blanc', and various synonyms thereof, many synonyms of questionable validity.

Origin: an old variety of Normandy, France; origin uncertain.

Source: Paul Lecolier, La Celle, St. Cloud, France, 3/25/37.

Literature: Baltet (5), Crochetelle (26), Power (66,67), Price and Ellett (68), Truelle (80,81), and Warcollier (85,87).

Date full bloom: May 13

Date first leaf: May 10

Fruit characteristics:

Size: diameter 1 3/4", length 1 3/8"

Shape: roundish oblate

Color: light green, no blush, heavy russet

Flesh: creamy white, crisp, firm, moderately juicy, sweet to sub-acid

Quality: poor

Harvest date: September 15

Note: at Glenn Dale, a small, unattractive, non-astringent cider type of little value; in France noted as a mid-season to late blossoming fruit, grown chiefly for cider.

Fire blight Index: 0.7

'Binet Violet'

P.I. 136247

Synonyms: 'Binet-gris'

Origin: an old French variety originating in Seine-Inferieure, France.

Source: Pepinieres A. Michel, Le Neubourg, (Eure), France, 3/30/40.

Literature: Anonymous (3), Duplessix (29), Power (66), and Warcollier (85,87)

Date full bloom: May 7

Date first leaf: May 9

Fruit characteristics:

Size: diameter 2 3/16", length 1 5/8"

Shape: oblate

Color: 0 to 10%, blushed, brick red over light green, many without blush

Flesh: creamy white, crisp, breaking, firm, somewhat dry, sweet to sub-acid, aromatic

Quality: fair to good

Harvest date: September 9

Note: in France, grown principally for cider, although used for dessert also; at Glenn Dale rather good eating (no astringency), possible value for late blooming in breeding.

Fire blight Index: 0.0

'Bodil Neergaard'

P.I. 104781

Synonyms: none known.

Origin: not known.

Source: Dr. C. G. Dahl, director, Experimentalfaltet, Akarp, Alnarp, Sweden, 3/16/34.

Literature: Florin (33), and Stedje & Skard (76).

Date full bloom: April 29

Date first leaf: April 28

Fruit characteristics:

Size: diameter 2 3/4", length 3"

Shape: Oblong conical

Color: 5%, blushed pink over yellow

Flesh: creamy, crisp, breaking, moderately firm, juicy, sweet, sub-acid

Quality: fair to good

Harvest date: September 3

Note: too mild to be a good dessert apple, lacks good color; some fruit hanging on tree November 12, 1962, still in good condition.

Fire blight Index: 0.2

'Bouteille de Liseux'

P.I. 161758

Synonyms: 'Bouteille'

Origin: thought to have originated near Liseux, France.

Source: Pepinieres Gaiyard-Rome, Chateauroux, Indre, France, 1/8/48.

Literature: Truelle (81).

Date full bloom: May 5

Date first leaf: May 5

Fruit characteristics:

Size: diameter 2 3/8", length 2 1/8"

Shape: roundish conical

Color: light green, no blush

Flesh: greenish white, crisp, breaking, firm, very juicy, sweet

Quality: good

Harvest date: October 2

Note: at Glenn dale, good quality, but unattractive; some water core; in France, grown chiefly as a sweet type cider apple.

Fire blight Index: 0.9

'Bravo De Esmolte'

P.I. 183958

Synonyms: none known.

Origin: not known.

Source: Ed. Sa Pereira, Porto, Portugal, 3/10/49.

Literature: none found.

Date full bloom: May 2

Date first leaf: April 28

Fruit characteristics:

Size: diameter 2 3/8", length 2 1/2"

Shape: roundish conical to oblique

Color: 20 to 30%, blushed, pink tinge over yellow

Flesh: white, crisp, breaking, firm, moderately juicy, sweet

Quality: fair

Harvest date: September 8

Note: too sweet to be a good apple.

Fire blight Index: 0.5

'Chataignier'

P.I. 136250

Synonyms: 'Chastaignier d'Hiver', 'Chataigne', 'De Castegnier',
'De Chatinier Martrange', 'Maltranche rouge'.

Origin: several versions of its name and origin; said to have been
grown in Normandy, France, since the year 1200.

Source: Pepinieres A. Michel, Le Neubourg (Eure), France, 3/30/40.

Literature: Chasset (20), Jonis et al. (42), Leroy (50), Tavernier &
Jacquin (78), and Warcollier (85,90).

Date full bloom: May 8

Date first leaf: May 4

Fruit characteristics:

Size: diameter 2 1/4", length 2"

Shape: variable, mostly roundish oblate

Color: 80%, blushed, striped, pale red over greenish-yellow

Flesh: creamy white, crisp, breaking, fine, moderately juicy,
sweet to sub-acid.

Quality: fair

Harvest date: September 15

Note: in France a dual purpose fruit, dessert, cooking and cider;
an early and a late blossoming type grown under this variety
name; we have the late blossoming type.

Fire blight Index: 1.0

'Cherry Pearmain'

P.I. 161831

Synonyms: none known.

Origin: an old variety, widely spread throughout the orchards of
Hereford, England; without any known history.

Source: C. Savidge, Nat. Agr. Advis. Ser., Hereford, England, 1/28/48.

Literature: Barker (6), Hogg (40), Hogg & Bull (41) and Spinks &
Clothier (74).

Date full bloom: April 29

Date first leaf: April 27

Fruit characteristics:

Size: diameter 2 3/4", length 2 1/8"

Shape: oblate, conical

Color: 80 to 90%, blushed, striped, crimson over yellow

Flesh: creamy white, crisp, tender to firm, juicy, sweet to sub-acid, aromatic

Quality: good

Harvest date: August 15

Note: some question that P.I. 161831 is the true variety; at Glenn Dale, bright attractive fruit of good flavor; in England a dual purpose fruit, cider, dessert and culinary.

Fire blight Index: 0.8

'Clozette'

P.I. 162712

Synonyms: 'Closette', 'Colozette', (incorrect).

Origin: variety of the Avranchin region, France; origin uncertain.

Source: Pepinieres du Clos Normand, St. Hilaire-du-Harcouet, Manche, France, 3/10/48.

Literature: Fau (32), Jourdain (43), and Warcollier (85,87,88,89).

Date full bloom: May 1

Date first leaf: April 28

Fruit characteristics:

Size: diameter 2 5/8", length 2 1/8"

Shape: roundish oblate

Color: 60 to 90%, blushed, pink-red over greenish-yellow

Flesh: white, crisp, somewhat tough, firm, moderately juicy, sweet to sub-acid, somewhat insipid

Quality: poor to fair

Harvest date: September 10

Note: at Glenn dale lacks good flavor, some water core; in France a dual purpose fruit, dessert and cider.

Fire blight Index: 0.8

'Court Pendu Plat'

P.I. 123960

Synonyms: 'Capendu', 'Coriandre Rose', 'Court pendu', 'Court pendu Extra', 'Court pendu gris', 'Court pendu Musque', 'Court pendu plat rougeatre', 'Court pendu Rond Gros', 'Court pendu Rose', 'Court pendu Rouge Musque', 'Garnon's Apple', 'Pomme de Berlin', 'Princess Noble Zoete', 'Reinette de Capenda', 'Russian', 'Wollaton Pippin'.

Origin: of great antiquity, dating certainly from the 16th century and possibly from the Roman days.

Source: Barnham Nurseries, Ltd., Barnham, England, 4/8/37.

Literature: Downing (28), Pom. Soc. France (63), and Taylor (79).

Date full bloom: May 6

Date first leaf: May 3

Fruit characteristics:

Size: diameter 2 1/2", length 1 3/4"

Shape: oblate

Color: 5 to 10%, blushed dull red over yellow, some russet

Flesh: creamy yellow, very firm, juicy, sub-acid
Quality: fair
Harvest date: October 6
Note: in England, noted for its very late flowering, adaptability to heavy soils, and canker resistance.
Fire blight Index: 0.3

'Cravert'

P.I. 131102

Synonyms: none known.
Origin: chance seedling in a field belonging to the French family, Depigny, around 1870; some contend that the tree was discovered in the forest of Allogny at an earlier date.
Source: Pepinieres Baltet Freres, Troyes (Aube), France, 12/22/38.
Literature: Chasset (19,24), Mauron (58), and Vernet (84).
Date full bloom: May 10
Date first leaf: May 8
Fruit characteristics:
Size: diameter 2 1/4", length 2 1/4"
Shape: roundish conical
Color: light green, no blush
Flesh: white, crisp, breaking, firm, juicy, sweet to sub-acid
Quality: fair to good
Harvest date: September 12
Note: in France, noted for its late flowering; fruits often seedless.
Fire blight Index: 2.3

'Crollon'

P.I. 162721

Synonyms: 'Belle de Crollon', 'Belle de Croslon' (incorrect).
Origin: in the Manche Avrancher region, France, named for the village of Crollon.
Source: Nombrot-Bruneau, Bourg-la-Reine, Seine, France, 3/10/48.
Literature: Labounoux (48), Raquet and Gougeon (69) and Warcollier (87,88).
Date full bloom: May 2
Date first leaf: May 2
Fruit characteristics:
Size: diameter 2 5/8", length 2"
Shape: roundish oblate, conical
Color: 30 to 60%, blushed pink-red over yellow
Flesh: creamy white, melting, tender, moderately juicy, sweet
Quality: fair
Harvest date: September 6
Note: in France; grown chiefly for cider.
Fire blight Index: 0.5

'De Flandres'

P.I. 127358

Synonyms: 'De Flandre', 'Pomme Figue'.

Origin: very much grown in the Aube, France; origin uncertain, but probably French.

Source: Pepinieres Baltet Freres, Troyes (Aube), France, 2/21/38.

Literature: Baltet (5), and Simon-Louis (73).

Date full bloom: May 7

Date first leaf: May 6

Fruit characteristics:

Size: diameter 2 1/2", length 2"

Shape: irregular, oblate-truncate, somewhat oblique

Color: 50 to 75%, blushed and striped, orange-red over green

Flesh: white, crisp, breaking, tender, moderately juicy, sweet to sub-acid

Quality: good

Harvest date: August 10

Note: in France, noted for its late flowering.

Fire blight Index: 0.3

'De Jaune'

P.I. 125560

(also P.I. 231941)

Synonyms: 'D'Argent', 'De jaune', 'de Jaune', 'De Jaune de la Sarthe',

'Pigonette Jaune du Mans', 'Pomme d'Argent Pepin de reinette',

'Pomme de Jaune', 'Pomme jaune de Saint Martin', 'Reinette du Mans'.

Origin: probably in the canton of Montfort (Sarthe), France. Another version attributes origin to Ireland and that around 1805 the English General Lawles imported it to the chateau de la Rochefort near Tours, but others claim the general found it at Sarthe.

Strongest evidence indicates variety about 300 years old and that it originated in Sarthe, France.

Source: Charles Detriche, Angers, France, 12/10/37.

Literature: Borg (13), Chasset (19, 20, 21), Duplessix (29), Enfer (31), Le Graverend (49), Leroy (50), Liron (51), Masseron (57), Pom. Soc. France (63), Roberts, et al. (70), Simon-Louis (73), Vernet (84), and Warcollier (86).

Date full bloom: May 5

Date first leaf: May 7

Fruit characteristics:

Size: diameter 2 3/8", length 1 3/4"

Shape: roundish conical

Color: greenish to lemon yellow, no blush

Flesh: greenish white, crisp, firm, juicy, sub-acid

Quality: fair

Harvest date: September 11

Note: in France, noted for its late flowering; a dual purpose fruit, dessert and cider, high ascorbic acid content; said to favor calcareous soils, where trees are healthier and fruits better quality.

Fire blight Index: 0.7

'Drap D'or Guemene'

P.I. 131823

Synonyms: 'Drap d'or de Guemene'.

Origin: not known.

Source: Lepage & Cie., Angers (Maine-et-Loire), France, 3/10/39.

Literature: none found.

Date full bloom: April 28

Date first leaf: April 30

Fruit characteristics:

Size: diameter 2 3/8", length 1 7/8"

Shape: roundish oblate

Color: 60%, striped red over yellow, heavy russeting

Flesh: white, crisp, breaking, tough, firm, moderately juicy,
sub-acid

Quality: poor

Harvest date: August 4

Note: heavy russeting makes fruit unattractive.

Fire blight Index: 0.7

'Dymock Red'

P.I. 161836

Synonyms: 'Dimock's Red', 'Dymock's Red'.

Origin: a very old variety, named for the village of Dymock,
Gloucestershire, England.

Source: C. Savidge, Nat. Agr. Adv. Ser., Hereford, England, 1/28/48.

Literature: Barker (6,7), Forsyth (34), Hogg (40), and Hogg & Bull
(41).

Date full bloom: April 29

Date first leaf: April 27

Fruit characteristics:

Size: diameter 2 1/4", length 1 5/8"

Shape: oblate

Color: 95 to 100%, blushed, dark red over greenish-yellow

Flesh: creamy white, crisp, breaking, firm, juicy, sweet to
sub-acid

Quality: good

Harvest date: August 30

Note: at Glenn Dale, small size against it, quality and texture very
good; in England, a dual purpose fruit, but used chiefly for cider;
listed by Barker (6) as decidedly sharp in flavor, not so at Glenn
Dale.

Fire blight Index: 0.7

'Emilia'

P.I. 123989

Synonyms: none known.

Origin: Div. of Hort., Central Exp. Farm, Ottawa, Canada; seedling
of Northern Spy open pollinated, seed sown autumn 1898, first fruit
1914.

Source: Dominion Exp. Sta., Ottawa, Canada, 4/12/37.
Literature: Macoun (52,53,54,55) and Roberts, et al. (70).

Date full bloom: April 30

Date first leaf: April 29

Fruit characteristics:

Size: diameter 3", length 2 1/2"

Shape: roundish oblate

Color: 40 to 70%, blushed, splashed, pink-red over greenish yellow

Flesh: white, crisp, somewhat melting, tender, juicy, sub-acid to tart

Quality: good

Harvest date: September 12

Note: pleasing texture, rather tart, but good flavor.

Fire blight Index: 1.5

'Faro'

P.I. 127360

Synonyms: 'Farau', 'Faraud', 'Fareau', 'Fareaud', 'Faro-Faraud', 'Faros', 'Farot', 'Gros Faros'.

Origin: Seine-et-Marne, France.

Source: Pepinieres Baltet Freres, Troyes (Aube), France, 2/21/38.

Literature: Carriere (18), Chasset (22,23), Downing (28), Moreau (59), Opoix (61) and Pom. Soc. France (63).

Date full bloom: May 4

Date first leaf: May 4

Fruit characteristics:

Size: diameter 3 1/4", length 2 1/2"

Shape: roundish oblate to truncate

Color: 80 to 100%, blushed and striped, deep red over yellow

Flesh: creamy white, fine, somewhat melting, soft to tender, juicy, sweet

Quality: fair to good

Harvest date: September 18

Note: in France, noted for its mid-to-late season flowering; a dual purpose fruit, dessert and cider, although generally considered too sweet for good quality in the latter.

Fire blight Index: 1.0

'Flaskeepel'

P.I. 105182

Synonyms: 'Ananas Apfel', (?), 'Berliner Hasenkopf' (?), 'Bunter Longhaus' (?), 'De Prince' (?), 'Englischer Flaschen Apfel' (?), 'Flasckenapfel' (?), 'Fraas apple' (?), 'Frankischer Nonnenapfel', 'Frankischer Nonnen-Apfel', 'Haberapfel' (?), 'Hasenkopf' (?), 'Jungfernapfel Halberstadter' (?), 'Melonenapfel' (?), 'Nonnen Apfel', 'Nonnetet', 'Nonnetette', 'Nonnetjes', 'Pomme de Prince' (?), 'Pomme de Princesse' (?), 'Prinzenapfel' (?), 'Rother gestreifter Paulsapfel' (?), 'Rothgestreifter Schlotter Apfel' (?),

'Schlotter Apfel v.d. Flees' (?), 'Trompeter Apfel' (?),
Considerable confusion regarding this variety; it would appear
there are at least two distinct varieties grown under some of
the variety names listed.

Origin: not known.

Source: Prof. Olav Moen, Norges Landbrukshoiskole, Aas, Norway,
4/18/34.

Literature: Biedenfeld (10), Clausen (25), Goetz & Balzer (36),
Kvalle (47), Schmidt (71), and Simon-Louis (73).

Date full bloom: April 30

Date first leaf: April 26

Fruit characteristics:

Size: diameter 2 7/8", length 2 3/4"

Shape: truncate, oblique

Color: 30 to 60%, striped, splashed, pink-red over yellow

Flesh: white, mealy, soft, tender, somewhat dry, sweet to
sub-acid

Quality: poor to fair

Harvest date: August 14

Note: in Germany, a dual purpose fruit, dessert and culinary.

Fire blight Index: 0.0

'Fleuritard'

P.I. 136592

Synonyms: none known.

Origin: not known.

Source: Pepinieres Baltet, Troyes (Aube), France, 4/16/40.

Literature: found in French nursery catalogs only.

Date full bloom: May 18

Date first leaf: May 17

Fruit characteristics:

Size: diameter 2 3/8", length 1 7/8"

Shape: variable, roundish oblate to oblique

Color: 40%, striped, pink-red over greenish-yellow; scarf-
skin

Flesh: greenish white, crisp, breaking, firm, juicy, sub-acid,
somewhat bitter

Quality: poor

Harvest date: September 12

Note: in France, a dual purpose variety; culinary and cider.

Fire blight Index: 2.0

'Frequin Lajoie'

P.I. 136255

Synonyms: 'Frequin-la-Joie'.

Origin: old variety from Caux region, France; origin uncertain.

Source: Pepinieres A. Michel, Le Neubourg (Eure), France, 3/30/40.

Literature: Duplessix (29), Power (66), and Warcollier (85,87).

Date full bloom: May 3

Date first leaf: April 30

Fruit characteristics:

Size: diameter 2 3/8", length 1 7/8"

Shape: oblique

Color: 60%, striped, washed, pink-red over greenish yellow

Flesh: creamy white, crisp, firm, juicy, sweet to sub-acid

Quality: fair

Harvest date: September 2

Note: P.I. 136255 is not true 'Frequin Lajoie' as described in literature, which lists it as early blossoming, fruit conical, better cider type.

Fire blight Index: 0.7

'Gewurzluiken'

P.I. 132225

Synonyms: none known.

Origin: long known and grown in Wurttemberg, Germany, especially in warmer regions.

Source: Wilhelm Pitzer, Stuttgart, Germany, 3/31/39.

Literature: Deut. Obsort. (27).

Date full bloom: April 29

Date first leaf: April 28

Fruit characteristics:

Size: diameter 2 1/4", length 1 3/4"

Shape: roundish, irregular

Color: 70 to 90%, blushed, striped, red over yellow

Flesh: white, crisp, breaking, firm, moderately juicy, sweet to sub-acid

Quality: good

Harvest date: September 10

Note: would be a good dessert apple if it had better size and more uniform shape.

Fire blight Index: 0.3

'Horner'

P.I. 161850

Synonyms: 'Hangdown', 'Horner's', 'Pocket Apple'.

Origin: grown about Horsham, Sussex, England; origin uncertain.

Source: C. Savidge, National Agricultural Advisory Service, Hereford, England, 1/28/48.

Literature: Barker (6), Hogg (40), Hogg & Bull (41), and Kieser & Pollard (44).

Date full bloom: April 30

Date first leaf: April 27

Fruit characteristics:

Size: diameter 2 1/2", length 2 1/4"

Shape: oval

Color: 30 to 60%, striped, pale crimson over yellow
Flesh: white, crisp, tender, juicy, sweet to sub-acid
Quality: fair to good
Harvest date: September 19
Note: in England, noted for its high Vitamin C content; a dual purpose fruit.
Fire blight Index: 0.7

'Ildrod Pigeon'

P.I. 114317

Synonyms: none known.
Origin: not known.
Source: Neils Esbjerg, director, Statens forsogsstation, Blungsted, Odense, Denmark, 4/10/36.
Literature: none found.
Date full bloom: April 30
Date first leaf: April 26
Fruit characteristics:
Size: diameter 2 3/8", length 2"
Shape: roundish ovate to oblique
Color: 30 to 60%, striped pink-red over yellow
Flesh: white, crisp to somewhat melting, tender, moderately juicy, sweet to sub-acid
Quality: fair to good
Harvest date: August 25
Fire blight Index: 1.3

'Lambron'

P.I. 136775

Synonyms: none known.
Origin: not known.
Source: Pinquet-Guindon et Fils, Saint-Symphorien (Indre-et-Loire), France, 4/22/40.
Literature: Florin (33) and Kobel (45).
Date full bloom: May 19
Date first leaf: May 17
Fruit characteristics:
Size: diameter 2 3/8", length 2"
Shape: roundish oblate, conical
Color: 10 to 40%, splashed, pink-red over green
Flesh: greenish white, crisp, firm, juicy, sweet, mild
Quality: fair to good
Harvest date: September 11
Note: in France, a dual purpose fruit, dessert and cider; at Glenn Dale, considerable fruit hanging on tree November 12, 1962, very good eating at this time.
Fire blight Index: 1.3

'Lande'

P.I. 162724

Synonyms: 'De Lande'.

Origin: not known.

Source: Pepinieres Nomblot-Bruneau, Bourg-la-Reine, Seine, France,
3/10/48.

Literature: found in French nursery catalogs only.

Date full bloom: May 14

Date first leaf: May 8

Fruit characteristics:

Size: diameter 2 5/8", length 1 3/4"

Shape: roundish oblate oblique (similar to York Imperial)

Color: 10 to 50%, striped red over yellowish white

Flesh: white, crisp, breaking, firm to tender, moderately juicy,
sweet to sub-acid, mild

Quality: good

Harvest date: September 12

Note: in France, a dual purpose variety; table and cider; at Glenn

Dale, mild, but promising for its dessert quality characteristics.

Fire blight Index: 0.3

'Lemon Pippin'

P.I. 157731

Synonyms: 'Englischer Winterquittenapfel', 'Kirke's Lemon Pippin',
'Pepin Limon de Galles' (?), 'Quince'.

Origin: uncertain, a very old variety known in England before 1744.

Source: J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex,
England, 2/24/47.

Literature: Downing (28), Hogg (40), Simon-Louis (73), Taylor (79)
and Wright (93).

Date full bloom: May 3

Date first leaf: May 2

Fruit characteristics:

Size: diameter 2 1/4", length 3"

Shape: oval oblong, with fleshy stem

Color: pale yellow over light green, some russet

Flesh: creamy white, crisp, firm, sub-acid to sprightly

Quality: fair to good

Harvest date: September 28

Note: in England, a dessert and culinary apple; almost no stem
cavity.

Fire blight Index: 0.7

'Lunowerapfel'

P.I. 132011

Synonyms: 'Apfel aus Lunow', 'Lunower Apfel', 'Pomme de Lunow'.

Origin: discovered near Lunow, at lower course of Oder River, Germany,
and probably originated there.

Source: L. Spath, Berlin, Germany, 3/23/39.

Literature: Girerd (35) and Muller, et al. (60).

Date full bloom: May 1

Date first leaf: April 28

Fruit characteristics:

Size: diameter 3", length 2 1/2"

Shape: roundish conical

Color: 30%, blushed orange-red over yellowish-green

Flesh: white, crisp, breaking, tender, moderately juicy,
sub-acid to tart

Quality: fair

Harvest date: August 29

Note: in Germany, noted for its shipping quality, blossoms early
mid-season there.

Fire blight Index: 1.7

'May Queen'

P.I. 123749

Synonyms: none known.

Origin: raised by Mr. Haywood of Worcester, England.

Source: George Bunyard & Co., Ltd., Maidstone, Kent, England,
4/20/37.

Literature: Taylor (79). Listed in several English nursery
catalogs.

Date full bloom: April 30

Date first leaf: April 29

Fruit characteristics:

Size: diameter 2 1/2", length 2"

Shape: roundish oblate to ovate

Color: 80 to 100%, blushed and striped crimson over green

Flesh: creamy yellow, crisp, breaking, firm, moderately juicy,
sub-acid

Quality: fair

Harvest date: August 19

Note: in England, noted as an excellent dessert apple, but subject
to brown rot.

Fire blight Index: 0.8

'Merton Delight'

P.I. 205461

Synonyms: none known.

Origin: John Innes, Horticultural Institution, Bayfordburg, Hertford,
Herts, England.

Source: John Innes, Hort. Inst., Bayfordburg, Hertford, Herts, England,
2/18/53.

Literature: none found.

Date full bloom: April 30

Date first leaf: May 1

Fruit characteristics:

Size: diameter 2 1/4", length 1 3/4"

Shape: roundish oblate

Color: 60%, striped, pink-red over yellow

Flesh: creamy, crisp to somewhat melting, tender, moderately juicy, sweet to sub-acid

Quality: good

Harvest date: August 7

Note: has good dessert qualities of flavor and texture, lacks size.

Fire blight Index: 0.2

'Michelin'

P.I. 136487

Synonyms: 'Pomme Michelin'.

Origin: a seedling raised by M. Legrand Yvetot, France; first fruited in 1872 and was dedicated by him to M. Michelin of Paris.

Source: Pepinieres F. Delaunay, Angers, France, 4/15/40.

Literature: Ball (4), Baltet (5), Crochetelle (26), Hauchecorne (39), Hogg and Bull (41), Power (66,67), Price & Ellett (68), Stanton (75), Truelle (80), and Warcollier (85,87).

Date full bloom: April 30

Date first leaf: May 3

Fruit characteristics:

Size: diameter 2 1/4", length 2"

Shape: variable, roundish conical to oblique

Color: 10 to 20%, blushed, red over greenish-yellow

Flesh: greenish white, crisp, somewhat tough and rubbery, dry to moderately juicy, sweet to sub-acid

Quality: poor

Harvest date: September 7

Note: at Glenn Dale, flesh browns rapidly on exposure; in France, grown chiefly for cider, noted for its late blossoming.

Fire blight Index: 1.3

'Norfolk Royal'

P.I. 123729

Synonyms: none known.

Origin: uncertain, an old variety grown for many years at North Walsham, Norfolk, England.

Source: Charles Townsend, Ltd., Fordham, Cambridgeshire, England, 4/15/37.

Literature: Taylor (79).

Date full bloom: April 29

Date first leaf: April 30

Fruit characteristics:

Size: diameter 2", length 2 1/4"

Shape: conical, oblong

Color: 40%, bright red over greenish-yellow, some russet

Flesh: creamy white, crisp, tender, juicy, sweet to sub-acid,
aromatic

Quality: fair to good

Harvest date: September 20

Note: somewhat resembles 'Wealthy' in flavor.

Fire blight Index: 0.3

'Northern Spy X Malling No. 11'

P.I. 137439

Synonyms: none known.

Origin: East Malling Res. Sta., East Malling, Kent, England.

Source: R. C. Hatton, director, East Malling Res. Sta., East
Malling, Kent, England, 5/10/40.

Literature: none found.

Date full bloom: May 3

Date first leaf: May 6

Fruit characteristics:

Size: diameter 2 1/2", length 2"

Shape: roundish oblate

Color: 60 to 100%, blushed, crimson red over green

Flesh: creamy white, crisp, breaking, firm, moderately juicy,
sub-acid, slight bitterness some years.

Quality: fair

Harvest date: September 25

Fire blight Index: 2.3

'Oetwiler Reinette'

P.I. 134809

Synonyms: 'Reinette d'Oetwil'.

Origin: a seedling of a large 'Parmain doree' or 'Reinette doree de
Blenheim' planted around 1890 by Jean Rueff of Oetwil sur Limmat
(canton of Zurich), Switzerland.

Source: Baumschulen Hans Zulauf Wildé, Schinznach-Dorf, Switzerland,
1/19/40.

Literature: Kobel (45), Kobel et al. (46), and Zsehokke (94)

Date full bloom: May 2

Date first leaf: May 2

Fruit characteristics:

Size: diameter 2 7/8", length 2 1/8"

Shape: roundish oblate, conical

Color: 10 to 30%, striped, pink-red over greenish-yellow,
some scarfskin

Flesh: white, crisp, firm, juicy, sub-acid to tart

Quality: fair

Harvest date: August 28

Fire blight Index: 1.7

'Paraquet'

P.I. 123964

Synonyms: 'Paroquet'.

Origin: said to be a seedling raised by Charles Ross, Welford Park, Berkshire, England.

Source: Barnham Nurseries, Ltd., Barnham, England, 4/8/37.

Literature: Taylor (79).

Date full bloom: May 3

Date first leaf: April 28

Fruit characteristics:

Size: diameter 2 1/2", length 2"

Shape: roundish, slightly angular

Color: 40 to 80%, blushed, pink-red over yellow

Flesh: creamy white, crisp, firm, juicy, sweet to sub-acid

Quality: fair to good

Harvest date: September 3

Note: in England, considered as a winter apple; at Glenn Dale, subject to watercore some years.

Fire blight Index: 0.7

'Piekne Oltarzewa'

P.I. 132829

Synonyms: 'Beauty of Oltarzewie'.

Origin: thought to be at the town of Oltarzewie, Poland.

Source: Zaklad Pomologiczny, A. Girdwoynia, w. Oltarzewie, Warszawa, Poland, 5/5/39.

Literature: listed in Polish nursery catalogs.

Date full bloom: April 29

Date first leaf: April 28

Fruit characteristics:

Size: diameter 3 5/8", length 2 3/4"

Shape: roundish oblate, slightly truncate

Color: 50 to 70%, blushed, striped, crimson over green

Flesh: greenish white, crisp, breaking, firm, moderately juicy to somewhat dry, sub-acid

Quality: fair

Harvest date: August 13

Note: at Glenn Dale, heavy cropper, fruit very large, good shape and appearance, only fair texture and quality, tends to ripen unevenly; in Poland noted for regular annual bearing and resistance of blossoms to frost.

Fire blight Index: 0.7

'Pine Golden Pippin'

P.I. 157734

Synonyms: none known.

Origin: not known.

Source: J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex, England, 2/24/47.

Literature: Hogg (40) and Wright (93).

Date full bloom: May 2

Date first leaf: May 3

Fruit characteristics:

Size: diameter 2 1/4", length 2 1/4"

Shape: roundish

Color: 70 to 100%, russet over yellow

Flesh: white, crisp, melting, tender, moderately juicy, sweet to sub-acid

Quality: fair

Harvest date: August 26

Fire blight Index: 1.3

'Present Van Holland'

P.I. 188520

Synonyms: none known.

Origin: not known.

Source: C. J. Gerritsen, Wageningen, Netherlands, 4/3/50.

Literature: none found.

Date full bloom: May 3

Date first leaf: May 2

Fruit characteristics:

Size: diameter 2 7/8", length 1 7/8"

Shape: decidedly oblate

Color: 70%, striped, red over yellow, some scarfskin

Flesh: creamy white, crisp, breaking, firm, juicy, sub-acid to tart

Quality: fair to good

Harvest date: August 21

Note: rather tart, and somewhat lacking in flavor for a dessert apple.

Fire blight Index: 0.5

'Reinette d'Espagne'

P.I. 126501

Synonyms: 'American Fall Pippin', 'Belle Josephine', 'Blanche', 'Blanche Cobbetts Fall Pippin', 'Blanche d'Espagne', 'Camoisas du roi d'Espagne', 'Camoise blanche', 'Camuesar', 'Camuezas', 'Camuzar', 'Camuzar Episcopale', 'Cobbetts Fall Pippin' (err.), 'Concombre ancien', 'De Ratteau', 'D'Espagne', 'Elgin Pippin' (?), 'Episcopale Fall Pippin' (err.), 'Fall Pippin' (?), 'Josephine', 'Large Fall', 'Large Fall Pippin', 'Philadelphia Pippin', 'Reinette A Gobelet', 'Reinette blanche', 'Reinette blanche d'Espagne', 'Reinette de Neubourg', 'Reinette gelbe', 'Reinette tendre', 'Saint Germain', 'White Spanish Reinette', 'York Pippin'.

Origin: an old European variety, long cultivated in Spain, France, and England.

Source: Pepinieres de La Maladrerie, Caen, France, 1/17/48.

Literature: Beach (8), Downing (28), Hogg (40), Jonis et al. (42), Leroy (50), Simon-Louis (73), and Stoll (77).

Date full bloom: May 2

Date first leaf: May 3

Fruit characteristics:

Size: diameter 3 3/4", length 3"

Shape: roundish oblate

Color: light to medium yellow, no blush

Flesh: white, melting, rather soft, dry to moderately juicy, mild, sub-acid

Quality: fair

Harvest date: September 6

Note: at Glenn Dale, rather good appearance for a yellow apple, some internal breakdown.

Fire blight Index: 0.0

'Roter Bellefleur'

P.I. 132000

Synonyms: 'Belle Fleur de Hollande', 'Belle Fleur rouge', 'Chancelier rouge de Suede', 'Chanoinesse de Salem', 'Eisenacher Koulmannekes', 'Haslinger', 'Hollandischer Bellefleur', 'Kronenbaum', 'Malmedienne', 'Malmedier', 'Malmedyer', 'Menznauer Jagerapfel', 'Pfingstapfel', 'Pomme d'Hasling', 'Roter Hollandische Bellefleur', 'Rotkanzler', 'St. Wendeler', 'Salemer Klosterapfel', 'Sauvageon de Schaerlis', 'Scharli's Welding', 'Schwedischer Rotkanzler', 'Siebenschlafer'.

Origin: a very old variety, known in Holland for more than 200 years; origin not certain.

Source: H. A. Schlösser, Neuss-Rhein, Germany, 3/22/39.

Literature: Muller et al. (60), and Zsehokke (94).

Date full bloom: May 6

Date first leaf: May 4

Fruit characteristics:

Size: diameter 2 1/2", length 2"

Shape: oblate oblique (similar to York Imperial)

Color: 80%, blushed crimson over light green

Flesh: greenish white, crisp, firm, somewhat tough, juicy, sub-acid to tart

Quality: fair

Harvest date: August 22

Note: in Germany noted for its late and long flowering; in Holland it is well known for its excellent keeping quality; at Glenn Dale observed free of scab and woolly aphids, stem exceedingly short, does not protrude from cavity, often swollen and fleshy.

Fire blight Index: 0.0

'St. Laurent'

P.I. 158739

Synonyms: 'Corse's St. Lawrence', 'Montreal', 'Reinette' (incorrect), 'Reinette de Saint Laurent' (incorrect), 'St. Lawrence', 'Saint-Lawrence', 'York and Lancaster'.

Origin: not definitely known but some credit it to eastern United States, others indicate origin Lower Canada; recommended as an American variety worthy of cultivation in England as early as 1835. In France two distinct varieties and possibly a third grown under the name 'St. Laurent'; one cider type apple, also called 'Reinette' and 'Reinette de Saint Laurent', originated at Saint Laurent-du-Mont (near Lisceux), France. P.I. 158739 most closely resembles the American variety.

Source: F. Dalaunay Nurseries, Angers, France, 4/22/47.

Literature: Beach (8), Blair (11), Downing (28), Leroy (50), Roberts et al. (70), Simon-Louis (73), and Warcollier (85).

Date full bloom: May 10

Date first leaf: May 11

Fruit characteristics:

Size: diameter 2 1/8", length 1 5/8"

Shape: roundish oblate

Color: 10 to 30%, splashed, red over green

Flesh: white, crisp, melting, tender, moderately juicy, sweet

Quality: fair to good

Harvest date: September 11

Note: in France noted for its late blossoming; at Glenn Dale, flesh browns quickly on exposure.

Fire blight Index: 0.7

'Saltcote Pippin'

P.I. 123967

Synonyms: none known.

Origin: fruits of this variety were sent to the Royal Hort. Soc. in 1927 by Mr. Herbert Chapman, Rye, England, who raised it.

Source: Barnham Nurseries, Ltd., Barnham, Sussex, England, 4/8/37.

Literature: Pomona (64), and Taylor (79).

Date full bloom: April 30

Date first leaf: April 30

Fruit characteristics:

Size: diameter 2 1/4", length 1 5/8"

Shape: oblate oblique (similar to York Imperial)

Color: 98 to 100%, blushed dark red over yellow

Flesh: creamy, crisp, breaking, firm, moderately juicy, sub-acid

Quality: good

Harvest date: August 30

Note: at Glenn Dale, a good quality, well-colored dessert apple, but lacks size and good shape; described by English nurserymen as large, conical, winter apple, Taylor lists as resembling Charles Ross which is round and even in shape; some question that P.I. 123967 is true variety.

Fire blight Index: 0.3

'Sandringham'

P.I. 157735

Synonyms: none known.

Origin: introduced by Messrs. Veitch in 1884; said to have been raised in the Sandringham Gardens, England.

Source: J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex, England, 2/24/47.

Literature: Bunyard & Thomas (17), Taylor (79) and Wright (93).

Date full bloom: May 3

Date first leaf: May 3

Fruit characteristics:

Size: diameter 3 1/2", length 2 3/4"

Shape: roundish conical

Color: 30 to 60%, striped red over greenish-yellow

Flesh: white, crisp, breaking, firm, juicy, sweet to sub-acid

Quality: fair to good

Harvest date: October 2

Note: in England, considered as a late, winter apple.

Fire blight Index: 0.7

'Storappel'

P.I. 188524

Synonyms: 'Belle Fille' (incorrect), 'Calville etoile', 'Etoilee', 'Pomme de Coeur', 'Reinette Etoilee', 'Reinette rouge etoilee', 'Rothe Sternreinette', 'Rote Sternreinette', 'Starappel', 'Sterappel', 'Sterreinette', 'Zoeti Reinette'.

Origin: described first in 1830; supposed to have been a native of Netherlands or Belgium.

Source: C. J. Gerritsen, Wageningen, Netherlands, 4/3/50.

Literature: Biedenfeld (10), Downing (28), Kobel (45), Leroy (50), Simon-Louis (73), and Taylor (79).

Date full bloom: May 6

Date first leaf: May 5

Fruit characteristics:

Size: diameter 2", length 1 7/8"

Shape: roundish

Color: 80 to 100%, blushed, striped, crimson over greenish-yellow, some scarfskin

Flesh: white, crisp, firm, juicy, sweet to sub-acid

Quality: fair

Harvest date: August 19

Note: in Netherlands and Germany, noted for its late blossoming.

Fire blight Index: 0.0

'Tom Putt'

P.I. 125271

Synonyms: 'Coalbrook', 'Marrow-bone', 'Tom Put'.

Origin: an old English variety, said to have been raised by Tom Putt, a rector in the Glastonburg area.

Source: George Pyne, Denver Nurseries, Topsham, Devon, England, 12/4/37.

Literature: Barker (7), Beach (8), Blair (12), Hogg (40), and Taylor (79).

Date full bloom: April 29

Date first leaf: April 29

Fruit characteristics:

Size: diameter 2 3/4", length 2 1/2"

Shape: roundish oblate

Color: 90 to 100%, blushed light crimson over yellow

Flesh: white, crisp, breaking, firm, juicy, sweet to sub-acid

Quality: good

Harvest date: August 15

Note: in England, two different types grown under this name; a dual purpose, dessert or culinary type and a sharp cider type; at Glenn Dale, we have the former type which is very attractive, having good shape and appearance.

Fire blight Index: 0.0

'Winter Queening'

P.I. 131217

Synonyms: 'Buckingham', 'Duck's Bill', 'Old English Pearmain' (?), 'Pearmain' (?), 'Winter Pearmain'. Considerable confusion regarding this variety; Beach (8) lists 'Winter Queening' with some 20 other variety names as synonyms of 'Buckingham'; Hogg (40), lists 'Duck's Bill' as synonym of 'Winter Pearmain'; several different varieties have been known under the name 'Winter Pearmain' both in Europe and the United States.

Origin: uncertain; Hogg (40) states Old English Pearmain is the oldest English apple on record, cultivated in Norfolk as early as the year 1200.

Source: J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, Sussex, England, 12/29/38.

Literature: Beach (8), Bunyard & Thomas (17), Hogg (40), Leroy (50), Taylor (79), and Wright (93).

Date full bloom: April 30

Date first leaf: May 1

Fruit characteristics:

Size: diameter 2 5/8", length 2 1/2"

Shape: roundish conical

Color: 80 to 90%, blushed and striped, dull crimson over light green, some russetting.

Flesh: creamy white, crisp, breaking, firm, moderately juicy, sub-acid, aromatic

Quality: fair to good

Harvest date: September 15

Note: in England, considered as a good, late keeping, cooking apple.

Fire blight Index: 0.7

'Winterrambour'

P.I. 126996

Synonyms: 'Rheinischer roter', 'Winter Rambo', 'Winter Rambour',
'Winter Ranbur', 'Winterrambur', 'Winterrambur rheinischer'.

Origin: not known.

Source: Jacob Zazelberg, Koln, Germany, 2/7/38.

Literature: Kobel (45), Roberts et al. (70), and Stoll (77).

Date full bloom: May 2

Date first leaf: April 30

Fruit characteristics:

Size: diameter 3 1/4", length 2 5/8"

Shape: oblique, oblate

Color: 50 to 70%, blushed, red over greenish-yellow

Flesh: creamy white, crisp, breaking, firm, moderately juicy,
sweet to sub-acid

Quality: fair to good

Harvest date: September 21

Note: some skin checking, produces poor pollen.

Fire blight Index: 1.3

(no variety name)

P.I. 209939

Synonyms: none.

Origin: a subtropical apple growing on the hot, frost-free
coast of Natal, north of Durban, Union of South Africa.

Source: F. B. Harrington, Deepdale, Natal, Union of South Africa,
8/17/53.

Literature: none found.

Date full bloom: May 1

Date first leaf: April 29

Fruit characteristics:

Size: diameter 3", length 2 1/4"

Shape: oblique-truncate, very heavily ribbed

Color: 40%, striped and splashed, pink over greenish-yellow

Flesh: white, crisp, firm, moderately juicy, sweet, insipid

Quality: poor to fair

Harvest date: September 18

Note: too mild and insipid, unattractive but unusual; said to
resemble 'Rome Beauty' in flavor, but at Glenn Dale, not as
good.

Fire blight Index: (no record)

